OO Expertise for Fermilab Experiments

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Outline

- **Run II OO Needs**
- **Acquiring OO Help**
- **Experiences**
- **Future Prospects and Lessons for other Experiments and Projects**

Run II and OO Programming

- **CDF and D0 both decided to make a change from Fortran/C to OO/C++**
  - **D0 decided on a complete rewrite**
  - **CDF strategy was for a phased rewrite with some Fortran 77 wrapped code included**
- **In both cases the transition was a large one, requiring training and expertise which did not exist within the experiments**

Strategy

- **D0, CDF and the Computing Division together helped to provide formal classes and training, HEP-wide training (Paul Kunz), and experiment-specific training.**
- **This succeeded to a great degree. However, it was felt that dedicated help was required to provide the advice and expertise needed for these major software projects.**

Dedicated OO/C++ Help

- **Both collaborations requested and the von Rüden committee agreed that the Computing Division should hire one (and later a second) OO/C++ expert for Run II software projects.**
- **A search was initiated in late summer 1997:**
  - **Local (Chicago) Computing Professional (CP) Search**
  - **Nation-wide CP search**
  - **HEP search (CERN courier, experiment bulleting boards)**
- **OO Expert (Jim Kowalkowski) was found and he started in early 1998.**

Initial Tasks

- **Early work focussed on immediate CDF/D0 requests and needs, including:**
  - **Code design discussions and consultation**
  - **Package/module designs**
  - **OO/C++ consulting**
  - **Authorship of modules and packages**

Success and second expert

- **Both collaborations were extremely happy with the work and expertise of the first OO/C++ expert.**
- **There was a request for a second expert, also endorsed by the von Rüden committee.**
- **A search was initiated in late summer 1998.**
- **Marc Paterno was picked and started in early 1999.**

Two experts

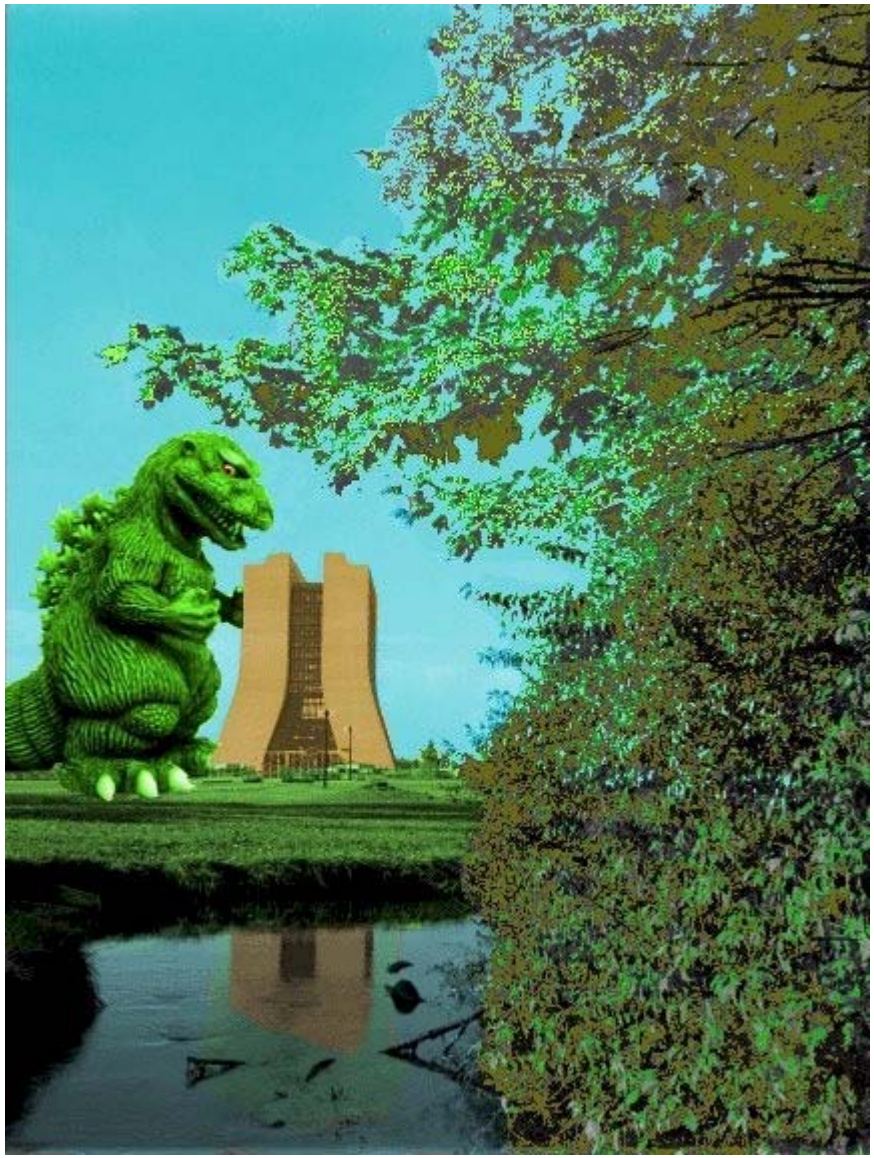
- **Two experts gave more flexibility, effort and talents for the projects**
- **CDF, D0 and CD managed the effort:**
  - **CDF and D0 assigned priorities and contact people with authority to determine the task priorities**
    - **This was very important for successful utilization of a scarce resource which many many people want to use.**
- **Jim and Marc kept CD informed of progress, problems and issues.**

Oversight and problem resolution

- **Jim and Marc work for the joint CD/CDF/D0 Computing Project**
- **The project is managed by a Steering Committee, consisting of representatives from all three organizations**
- **Conflicts, priority-determination, etc. are all handled by the Steering Committee**
- **This has not been a serious issue for Jim and Marc though it is nice to have a mechanism for resolving potential problems**

Evaluation

- **The two experts have been invaluable. Though hard to prove the quality of the code, maintainability, documentation, etc. have all been improved substantially.**
- **Having "external" expertise allows the collaborations to use scarce internal resources for other tasks.**
- **The "external" nature of the expertise also allows for reviews of collaboration projects.**
  - **With mostly positive results...**



From Jim and Marc's Web Page

Jim and Marc visited by a recent reviewee

Evaluation (cont.)

- **Both experts need and desire to develop software to keep their skills up, to have a more interesting life, etc.**
- **This has been an unexpected but positive benefit of having the two experts involved in Run II software.**
- **Having both experts work on both CDF and D0 has led to some commonality in approach and in some cases common software.**

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Talks
Jim Kowalkowski
Marc Paterno

The CD/SA Department is involved with both the CDF and DØ experiments. We are involved with various software development efforts, working towards the beginning of data collection for Run II of the Tevatron.

Our group is part of the Fermilab Computing Division, and consists of two members, Jim Kowalkowski and Marc Paterno.

At the left is a navigation bar to help you find your way around our web site.

- Software Review Guidelines leads to the description of the review process, for the reviews we conduct.
- CDF Projects leads to the projects we are involved with that are specific to the CDF experiment. This includes the CDF software reviews we have conducted.
- DØ Projects leads to the projects we are involved with that are specific to the DØ experiment. This includes the DØ software reviews we have conducted.
- Examples leads to some examples of OOAD or C++ techniques with think will be of interest to the Fermilab community.
- Useful Links leads to a page with a links to a few useful online resources concerning C++ programming.
- Talks leads to a page with links to online versions of some of the talks we have presented.

Another group with significant contributions to the Run II projects is the Physics Class Library Task Force (the ZOOM group).

Document: Done

Lessons, Future

- **The availability and use of two OO/C++ experts was and continues to be significant and positive for CDF, D0 and the Computing Division at Fermilab.**
- **Run II software is better designed, reviewed and documented as a result.**
- **Other experiments at Fermilab likely will benefit from this approach.**

HEP software lessons

- **HEP can use help when making a major transition in software languages, methodologies, or simply a major code construction.**
- **The technique of using outside experts in a common project works well.**
- **This will likely become useful in the future when HEP transitions again.**